

CLAIM(S):

1. In an additive process three-dimensional modeling machine, the improvement comprising:
 - a platform for supporting a modeling substrate, the platform including a plurality of keyholes; and
 - a substantially rigid substrate having a modeling surface and a plurality of projections, each projection configured to be removably seated in a corresponding one of the keyholes so as to engage the substrate and the platform in a connected position; and
 - a locking mechanism for securing the substrate to the platform in the connected position, by preventing relative movement between the substrate and the platform when the substrate projections are engaged in the keyholes.
2. The modeling machine of claim 1, wherein the platform moves along a z-axis in the modeling machine.
3. The modeling machine of claim 1, wherein the substrate is comprised of plastic.
4. The modeling machine of claim 1, wherein the substrate is formed of molded plastic.
5. The modeling machine of claim 1, wherein the modeling surface of the substrate has a texture.
6. The modeling machine of claim 5, wherein the texture is rough.

7. The modeling machine of claim 5, wherein the texture is smooth.
8. The modeling machine of claim 5, wherein the texture is a medium-course EDM finish.
9. The modeling machine of claim 1, wherein the modeling surface of the substrate includes a grid.
10. The modeling machine of claim 9, wherein the grid is defined by grooves in the modeling surface.
11. The modeling machine of claim 1, wherein the modeling surface is substantially flat.
12. The modeling machine of claim 1, wherein the substrate further comprises a handle.
13. The modeling machine of claim 1, wherein the substrate further comprises an extension tab, and wherein the modeling machine is programmed with a substrate detection routine which identifies the substrate on the platform by detecting the extension tab, and responsively configures operating parameters of the machine.
14. The modeling machine of claim 1, wherein the locking mechanism comprises at least one retainer rotatably mounted on an edge of the platform.

15. The modeling machine of claim 1, wherein the substrate further comprises at least one detent on an edge of the substrate, positioned to engage the at least one retainer.

16. The modeling machine of claim 1, wherein the keyholes each have an opening and a depending slot, and wherein the projections each have a leg and a foot portion, with each foot portion being sized to fit through the opening of its corresponding keyhole and each leg portion being sized to fit into the depending slot of said keyhole, such that the projections are engaged in the keyholes when the foot portions are located beneath the top surface of the platform and the leg portions are seated in the slots.

17. The modeling machine of claim 16, wherein the openings of the keyholes are forward of their respective slots.

18. For use in a three-dimensional modeling machine, an apparatus comprising:

a platform having a plurality of male connectors through a surface thereof;

a substantially rigid, non-dusting substrate adapted to be releasably secured to the platform in a connected position wherein the substrate is supported in a defined configuration on the surface of the platform, the substrate having an outward-facing, substantially flat modeling surface and a plurality of female connectors configured to be seated in an engaged position in corresponding ones of the male connectors; and

a locking mechanism for preventing relative movement between the substrate and the platform when the female connectors are seated in the male connectors.

19. The apparatus of claim 18, wherein the substrate is comprised of plastic.
20. The apparatus of claim 18, wherein the substrate is formed of molded plastic.
21. The apparatus of claim 18, wherein the modeling surface of the substrate has a texture.
22. The apparatus of claim 21, wherein the texture is rough.
23. The apparatus of claim 21, wherein the texture is a medium-course EDM finish.
24. The apparatus of claim 18, wherein the modeling surface of the substrate includes a grid.
25. The apparatus of claim 18, wherein the substrate further comprises a handle.
26. The apparatus of claim 25, wherein the handle extends from a front edge of the substrate.

27. The apparatus of claim 25, wherein the handle has a thermal conductivity lower than that of the modeling surface.

28. The apparatus of claim 18, wherein the substrate is reusable.

29. The apparatus of claim 18, wherein the locking mechanism comprises at least one retainer rotatably mounted on an edge of the platform.

30. The apparatus of claim 29, wherein the substrate further comprises at least one detent on an edge of the substrate, positioned to engage the at least one retainer.

31. The apparatus of claim 18, wherein the male connectors are keyholes each have an opening and a depending slot and the female connectors are projections comprising a leg portion and a terminal foot portion, with each foot portion being sized to fit through the opening of its corresponding keyhole and each leg portion being sized to fit into the depending slot of said keyhole, such that the projections are engaged in the keyholes when the foot portions are located beneath the top surface of the platform and the leg portions are seated in the slots.

32. The apparatus of claim 31, wherein the openings of the keyholes are forward of their respective slots.

33. For use in a three-dimensional modeling machine, an apparatus comprising a platform and a substrate,

the platform and the substrate being adapted to be releasably locked together in a connected position, wherein the substrate is

supported in a defined configuration on the platform such that a modeling surface of the substrate faces outward; said platform including a means for securing the substrate in the connected position; and said substrate comprising a substantially rigid, non-dusting tray providing the modeling surface, and integral means for engaging the means for securing the substrate.

34. The apparatus for claim 33, and further comprising:
locking means for preventing relative movement between the substrate and the platform in their connected position.
35. The apparatus of claim 34, wherein the means for securing the substrate comprises a plurality of keyholes, each having an opening and a depending slot.
36. The apparatus of claim 35, wherein the means for engaging the means for securing the substrate comprises a plurality of projections, each having a leg portion and a terminal foot portion, with each foot portion being sized to fit through the opening of an associated one of the keyholes and each leg portion being sized to fit into the depending slot of said keyhole, such that the platform and the substrate are in the connected position when the foot portions of the projections are located beneath the top surface of the platform and the leg portions are seated in the slots.
37. The apparatus of claim 33, wherein the substrate further comprises a handle.

38. For use in an additive process three-dimensional modeling machine of the type which builds models on a substrate supported by a modeling platform, a substrate comprising:

a substantially rigid, non-dusting tray having a substantially flat modeling surface, the modeling surface having a texture;
and
a plurality of spaced female connectors extending from the tray for engaging the modeling platform.

39. The substrate of claim 38, wherein the substrate is comprised of plastic.

40. The substrate of claim 38, wherein the substrate is a unitary injection molded part.

41. The substrate of claim 38, wherein the texture of the modeling surface is smooth.

42. The substrate of claim 38, wherein the texture of the modeling surface is a medium-course EDM finish.

43. The substrate of claim 38, wherein the modeling surface includes a grid.

44. The substrate of claim 43, wherein the grid is defined by grooves in the modeling surface.

45. The substrate of claim 38, and further comprising a handle integral with the tray.
46. The substrate of claim 38, and further comprising a tab extending outward from the tray.
47. The substrate of claim 38, wherein the substrate is reusable.
48. The apparatus of claim 38, wherein the female connectors comprise projections each having a leg portion and a terminal foot portion.
49. In an additive process three-dimensional modeling machine, the apparatus comprising:
a platform;
a substantially rigid, non-dusting substrate having a modeling surface;
means integral with the platform for engaging the substrate on the platform in a connected position wherein the modeling surface of the substrate faces outward; and
means integral with the substrate for engaging the means integral with the platform.
50. The apparatus of claim 49, wherein the means integral with the platform comprises male connectors.
51. The apparatus of claim 50, wherein the male connectors are keyholes.

52. The apparatus of claim 51, wherein the means integral with the substrate comprises female connectors.

53. The apparatus of claim 52, wherein the female connectors comprise projections configured to be removably engaged in corresponding ones of the keyholes, the projections each having a leg portion and a terminal foot portion.

54. The apparatus of claim 49, and further comprising:
locking means for preventing relative movement between the
substrate and the platform in their connected position.

55. The apparatus of claim 49, wherein the substrate is reusable.

56. The apparatus of claim 49, and further comprising a handle integral with the substrate.

57. The apparatus of claim 49, wherein the substrate further comprises a tab extending outward therefrom.

58. A method for loading a modeling substrate in an additive process three-dimensional modeling machine, comprising the steps of:

providing a platform for supporting a substrate, the platform having
a plurality of male connectors through a surface thereof;
providing a substantially rigid, non-dusting substrate having a
modeling surface and a plurality of integral female
connectors, each female connector configured to be seated
in an engaged position in a corresponding one of the male
connectors;

seating the female connectors in the corresponding male connectors; and
locking the substrate onto the platform.

59. The method of claim 58, wherein the male connectors are keyholes and the female connectors are projections comprising a leg portion and a terminal foot portion.

60. The method of claim 59, wherein the step of engaging comprises:
positioning the substrate on the platform so that each projection fits through the corresponding keyhole; and
sliding the substrate along the platform until the projections are fully seated in the keyholes.

61. The method of claim 58, wherein the substrate further has a tab extending outward therefrom, and further comprising the step of:
identifying the substrate on the platform by detecting the presence of the tab.

62. The method of claim 58, and further comprising the steps of:
building a model on the modeling surface of the substrate;
removing the substrate from the platform after building the model;
removing the model from the modeling surface of the substrate;
repeating the steps of engaging and locking; and
reusing the substrate for building subsequent models.